

What is Claimed Is:

1. In a code-division-multiple-access (CDMA) system employing spread-spectrum modulation comprising a base station (BS) comprising a BS-spread-spectrum transmitter and a BS-spread-spectrum receiver, and a plurality of mobile stations, each mobile station (MS) comprising an MS-spread-spectrum transmitter and an MS-spread-spectrum receiver, a method  
5 comprising the steps of:

computing an initial power estimate for a first access attempt by one of the mobile stations;

transmitting from the MS-spread-spectrum transmitter of the one mobile station a spread-spectrum signal signifying a first attempt to utilize a random access channel, at a power  
10 level based on the initial power estimate;

receiving one or more access attempt signals relating to the random access channel at the BS-spread-spectrum receiver;

measuring the one or more access attempt signals received by the BS spread-spectrum receiver;

15 computing a closed loop power control symbol specifying an extent that power of the of measured one or more received access attempt signals differs from a target power;

broadcasting a control message containing the closed loop power control symbol from the BS-spread-spectrum receiver; and

if MS-spread-spectrum receiver of the one mobile station does not detect an  
20 acknowledgement responsive to the first access attempt of the one mobile station:

(a) receiving the broadcast control message and obtaining the closed loop power control symbol;

(b) processing a signal received from the base station in the MS-spread-spectrum receiver of the one mobile station to produce an open loop power control symbol  
25 specifying an extent of a change in power for uplink transmissions regarding the random access channel;

(c) generating a power control command as a function of both the closed loop power control symbol and the open loop power control symbol; and

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30 (d) transmitting from the MS-spread-spectrum transmitter of the one mobile station a spread-spectrum signal signifying a second attempt to utilize the random access channel, at a power level based on the power control command.

2. The method as in claim 1, wherein each of the power control symbols comprises a multi-bit symbol.

3. The method as in claim 1, wherein the mobile station delays the step of transmitting the spread-spectrum signal signifying a second attempt to utilize the random access channel by a predetermined amount, in response to at least one possible combination of values of the closed loop power control symbol and the open loop power control symbol.

4. The method as in claim 1, wherein:

the step of measuring the one or more access attempt signals comprises measuring a signal to noise ratio of the one or more access attempt signals at the BS-spread-spectrum receiver; and

5 the step of computing the closed loop power control symbol comprises computing difference between the measured signal to noise ratio and a target signal to noise ratio and mapping the difference to a corresponding multi-bit symbol value.

5. The method of claim 1, wherein the step of processing the signal received from the base station to produce an open loop power control symbol comprises:

determining a signal to noise ratio of the signal received from the base station; and

computing difference between the determined signal to noise ratio and a target signal to

5 noise ratio; and

mapping the difference to a corresponding multi-bit symbol value.

6. The method as in claim 1, wherein the step of computing an initial power estimate comprises:

receiving a broadcast spread spectrum signal from the base station in the MS-spread-spectrum receiver of the one mobile station;

5 measuring the received broadcast spread spectrum signal; and

computing the initial power estimate based on the measurement of the received broadcast spread spectrum signal.

7. The method as in claim 1, further comprising communicating between the mobile station and the base station via an uplink access channel (ACCH) channel and a dedicated forward access channel (FACH) channel, in response to a successful one of the attempts to utilize the random access channel.

8. A method of attempting access to a random-access channel serviced through a base station of a code-division-multiple-access (CDMA) wireless communication system, the method comprising:

transmitting a spread-spectrum signal signifying a first attempt to utilize the random access channel, from a mobile station, at a predetermined power level; and

if the mobile station does not detect an acknowledgement responsive to the first access attempt:

receiving a broadcast control message from the base station containing a closed loop power control symbol specifying an extent that power of a signal received at the base station differs from a target power;

processing a signal received from the base station to produce an open loop power control symbol specifying an extent of a change in power for uplink transmissions regarding the random access channel;

generating a power control command as a function of both the closed loop power control symbol and the open loop power control symbol; and

transmitting from the mobile station a spread-spectrum signal signifying a second attempt to utilize the random access channel in a manner controlled as a function of the power control command.

9. The method of claim 8, wherein each of the signals signifying one of the attempts to utilize the random access channel comprises a preamble code sequence associated with the random access channel and a data message.

10. The method of claim 8, wherein:

the power control command can specify different levels of increase or decrease in transmission power for control of the signal transmission signifying the second attempt; and

the composite power control command can specify a back-off by the mobile station.

11. A code-division-multiple-access (CDMA) wireless remote station, comprising:  
 a CDMA transmitter;  
 a CDMA receiver; and

a controller coupled to the CDMA receiver for responding to signals received via the  
 5 CDMA receiver and coupled for controlling the CDMA transmitter, such that in operation the  
 CDMA remote station is for performing the following steps:

transmitting a spread-spectrum signal signifying a first attempt to utilize the random  
 access channel, from the mobile station, at a predetermined power level; and

10 if the mobile station does not detect an acknowledgement responsive to the first access  
 attempt:

receiving a broadcast control message from the base station containing a closed loop  
 power control symbol specifying an extent that power of a signal received at the base station  
 differs from a target power;

15 processing a signal received from the base station to produce an open loop power  
 control symbol specifying an extent of a change in power for uplink transmissions regarding  
 the random access channel;

generating a power control command as a function of both the closed loop power  
 control symbol and the open loop power control symbol; and

20 transmitting from the mobile station a spread-spectrum signal signifying a second  
 attempt to utilize the random access channel in a manner controlled by the power control  
 command.

12. The CDMA wireless remote station as in claim 11, wherein the controller  
 comprises means for mapping combinations of the open loop and closed loop power control  
 symbol into values of the power control command.

13. The CDMA wireless remote station as in claim 12, wherein:

each of the power control symbols comprises a multi-bit value, and

5 the means for mapping maps the combinations of multi-bit values for the open loop and  
 closed loop power control symbol into values of the power control command which can  
 selectively specify different levels of increase and decrease in transmission power and a back-  
 off by the wireless remote station.

14. The CDMA wireless remote station as in claim 11, wherein the transmitting of the signal signifying a first attempt involves computing an initial power estimate and the predetermined power level corresponds to the initial power estimate.

15. The CDMA wireless remote station as in claim 14, wherein the controller comprises means for computing the initial power estimate in response to one or both of: (1) a broadcast transmit power symbol received in a broadcast signal from the base station detected by the CDMA receiver, and (2) a measured received-signal-strength-indicator value determined  
5 in response to a broadcast signal from the base station detected by the CDMA receiver.

16. The CDMA wireless remote station as in claim 11, wherein the controller comprises means for computing a multi-bit value for the open loop power control symbol as a function of a signal to noise ratio determined for a broadcast signal from the base station detected by the CDMA receiver.